

REMARKS

Applicant respectfully requests reconsideration in view of the amendment and following remarks. Support for amended claim 1 can be found in the specification at page 2, lines 8-18 and page 3, lines 5-9. Support for amended claim 21 can be found in the specification at page 2, lines 8-18. Support for amended claims 17 and 34 can be found in the specification at page 2, lines 11-12. Support for newly added claim 35 can be found in the specification at page 2, lines 18. Support for newly added claim 36 can be found in claim 8 and in the specification at page 2, lines 14 and 15.

Claims 14 and 18 are provisionally rejected on the ground of non-statutory obviousness type double patenting as being unpatentable over claim 20 of copending application 10/580,323 (“‘323 application”). Claims 14-18, 27 and 28 are rejected under 35 U.S.C. 112, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 14-18, 27 and 28 are rejected 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process. Claims 21, 23 and 32-32 are rejected under 35 U.S.C. 112 as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 14-20 and 22-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Smith et al. (U.S. Pat. No. 5,276,063) (“Smith”). Claims 14-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith. The applicant respectfully traverses these rejections.

Double Patenting Rejection

Claims 14 and 18 are provisionally rejected on the ground of non-statutory obviousness type double patenting as being unpatentable over claim 20 of ‘323 application.

Obviousness-type double patenting as defined is when claims in a patent application are not patentably distinguishable from claims in a patent (MPEP 804). The test applied to determine obviousness-type double patenting exists is whether or not the claims in the application define merely an obvious variation of the invention disclosed and claimed in the patent (In re Vogel and Vogel, 164 USPQ 619 (CCPA 1970). If claims are unobvious over 35 U.S.C. §103, there can be no double patenting (In re White and Langer, 160 USPQ 417 (CCPA 1969)). The Examiner refers that these claims overlap or at least encompass each other. The Examiner has apparently confused domination with double patenting. Domination occurs when a patent has a broader generic claim which reads on an invention defined by a narrower or more specific claim in another patent. Domination is not double patenting, *per se*. Domination is an irrelevant fact since a later invention may be validity patented though dominated by an earlier patent (In re Kaplan, 229 USPQ 678 (CAFC 1986)). Further, the overlapping of claims is not a significant or controlling factor in obviousness-type double patenting (In re Longi et al., 225 USPQ 645 (CAFC 1985)). The proper consideration of obviousness type doubling patenting is the improper extension of the patent right. The applicants believe that these applications are patentably distinct for the reasons stated below.

Claim 20 of the '323 application claims

16. A method for foam manufacture in a foam manufacturing equipment designed for use with a blowing agent containing at least one hydrochlorofluorocarbon comprising using a composition comprising at least one hydrofluorocarbon blowing agent and a non-halogenated polar organic compound having an atmospheric boiling point of from 30°C to 150°C.

19. The method according to claim 16, wherein the hydrofluorocarbon comprises 1,1-difluoroethane (HFC-152a).

20. The method according to claim 19, wherein the hydrofluorocarbon comprises further 1,1,1,2-tetrafluoroethane.

Claim 20 rewritten in the independent form would be as follows

A method for foam manufacture in a foam manufacturing equipment designed for use with a blowing agent containing at least one hydrochlorofluorocarbon comprising using a composition comprising at least one hydrofluorocarbon blowing agent and a non-halogenated polar organic compound having an atmospheric boiling point of from 30°C to 150°C wherein comprises 1,1-difluoroethane (HFC-152a) and 1,1,1,2-tetrafluoroethane.

The applicant has amended claim 14 as follows:

14. A process for the manufacture of a polystyrene closed-cell foam in which a which comprises extruding a blend of polymer and a blowing agent to obtain the polystyrene closed cell foam wherein said blowing agent comprising 1,1-difluoroethane, 1,1,1,2-tetrafluoroethane and optionally an additive is employed and said blowing agent comprising more than 80% by weight of 1,1-difluoroethane and 1,1,1,2-tetrafluoroethane and in which the weight ratio of 1,1-difluoroethane to 1,1,1,2-tetrafluoroethane in the blowing agent is at most 4.¹

The applicant's claim 14 now requires the following features said blowing agent comprising more than 80% by weight of 1,1-difluoroethane and 1,1,1,2-tetrafluoroethane and in which the weight ratio of 1,1-difluoroethane to 1,1,1,2-tetrafluoroethane in the blowing agent is at most 4. These features are not claimed '323 application. For the above reasons, this rejection should be withdrawn.

Rejections Over 101/112

Claims 14-18, 27 and 28 are rejected under 35 U.S.C. 112, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the

¹ The terms underlined were added to the claim during this amendment.

invention. Claims 14-18, 27 and 28 are rejected 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process. Claims 21, 23 and 32-32 are rejected under 35 U.S.C. 112 as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The applicant believes that the claims as amended are in compliance with 35 U.S.C. 101 and 112. For the above reasons, these rejections should be withdrawn.

Rejections Over Smith

Claims 14-20 and 22-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Smith. Claims 14-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith.

The applicant's claimed invention requires at least 16% 1,1,1,2-tetrafluoroethane (see the end of independent claim 14 which states "more than 80% by weight of 1,1-difluoroethane and 1,1,1,2-tetrafluoroethane and in which the weight ratio of 1,1-difluoroethane to 1,1,1,2-tetrafluoroethane in the blowing agent is at most 4". For these two features to be met the minimum amount of 1,1,1,2-tetrafluoroethane is at least 16% by weight and the amount of 1,1-difluoroethane is 64% by weight. Thereby the HFC-134 is at least 16% and the 1,1-difluoroethane is 64%. The 1,1-difluoroethane would be 4 times more. This would be the minimum of 80%. If there was 100% by weight of 1,1-difluoroethane and 1,1,1,2-tetrafluoroethane and the weight ratio of 1,1-difluoroethane to 1,1,1,2-tetrafluoroethane in the blowing agent is at most 4, then HFC-134a would be 20% and the 1,1-difluoroethane is 80%.

Smith teaches at col. 3, lines 28-30,

[t]he blowing agents may further comprise small amounts (less than 15 weight percent) of a tertiary blowing agent comprising other known blowing agents.

The tertiary blowing agent is 1,1,1,2-tetrafluoroethane (HFC-134a). Smith discloses that HFC-134a can NOT be present in an amount more than 15 weight %. Again, the applicant's minimum amount of HFC-134a is at least 16%. Clearly Smith teaches away from the applicant's claimed invention.

Furthermore, Smith further states at col. 4, lines 18-34

A surprising feature of this invention is that it is possible to blow a closed-cell, alkenyl aromatic polymer foam structure using HFC-152a as the primary blowing agent. The use is surprising in view of its relatively low solubility in alkenyl aromatic polymers, such as polystyrene, and its relatively high vapor pressure. Typically, the ability of a blowing agent to produce a foam structure with relatively large cells has been observed to decrease as its solubility in the polymer decreases and as its vapor pressure increases. Thus, a blowing agent with relatively low solubility and a relatively high vapor pressure will usually produce a relatively small cell size foam structure. A blowing agent with relatively high solubility and relatively low vapor pressure will usually produce a relatively large cell size foam structure. The process of the present invention is surprising because it does not follow previous observations. (emphasis added)

Table 1 illustrates solubility and vapor pressure data for several common blowing agents. Therefore, from table 1, it is clear that HFC-134a has even a lower solubility than HFC-152a and a higher vapor pressure than HFC-152a. Again, as stated above,

“ a blowing agent with relatively low solubility and a relatively high vapor pressure will usually produce a relatively small cell size foam structure. A blowing agent with relatively high solubility and relatively low vapor pressure will usually produce a relatively large cell size foam structure.” (emphasis added)

Therefore, it would have been expected that HFC-134a would be even less likely to produce a relatively large cell size foam structure than HFC-152a or other blowing agents listed in Table 1. This is further confirmed at col. 4, lines 54-68 of Smith,

Relatively large cell size alkenyl aromatic polymer foams have been made using HCFC-142b with or without ethyl chloride. HCFC-142b has been used successfully in making large cell size foams because of its relatively moderate solubility in alkenyl aromatic polymers and its relatively moderate vapor pressure.

Other above-mentioned blowing agents, namely CFC-12, HCFC-22, HFC-134a, typically have not been successfully employed in making relatively large cell foams due to their relatively low solubility in alkenyl aromatic polymers and high vapor pressure. Given that HFC-152a has similar vapor pressure and solubility in alkenyl aromatic polymers as those blowing agents, it is surprising that a relatively large cell size foam could be produced with it. (emphasis added)

The results for Table 1 also confer that HFC -134a is the worst with respect to solubility.

HFC -134a only had a 1.0 solubility. In addition, HFC-134a also had a high vapor pressure (665.4) especially compared to HCFC -142b (337.9). It is interesting to note that the three unsuccessful blowing agents, CFC-12, HCFC-22 and HFC-134a, were the only blowing agents listed in table 1 that had a vapor pressure over 600 (651.3, 1044 and 665.4 respectively). It is also interesting to note that the three unsuccessful blowing agents, CFC-12, HCFC-22 and HFC-134a, were the only blowing agents listed in table 1 that had a solubility less than 1.7 (1.5, 1.6 and 1.0 respectively). In fact, HFC-134a had the lowest solubility of the group. For the above reasons, Smith teaches away from the claimed invention and these rejections should be withdrawn.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

A three month extension fee has been paid. Applicant believes no additional fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 03-2775, under Order No. 05129-00053-US from which the undersigned is authorized to draw.

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Respectfully submitted,

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